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Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In Re Application of:

Worrel

Serial No. 10/708,854

Group Art Unit: 3683

Filed: 03/29/2004

Examiner: Kramer, Devon C.

For: VEHICLE REGENERATIVE BRAKING SYSTEM WITH SYSTEM MONITOR  
AND REDUNDANT CONTROL CAPABILITY

Attorney Docket No. 81098042CIP

## CERTIFICATE OF MAILING/TRANSMISSION (37 C.F.R. § 1.8(a))

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Nicole M. Thurman

BRIEF ON APPEALMail Stop Appeal Brief - Patents  
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Sir:

The following Appeal Brief is submitted pursuant to the Notice of Appeal dated  
September 26, 2005, for the above-identified application.

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**I. Real Party in Interest**

The real party in interest in this matter is Ford Global Technologies, LLC, which is a wholly owned subsidiary of Ford Motor Company both in Dearborn, Michigan (hereinafter "Ford").

**II. Related Appeals and Interferences**

There are no other known appeals or interferences which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

**III. Status of the Claims**

1-11 stand rejected in the Final Office Action.

**IV. Status of Amendments**

There have been no Amendments filed after the final rejection.

**V. Summary of Claimed Subject Matter**

The present system provides regenerative and friction braking in a vehicle. The system includes a brake controller for determining a desired rate of deceleration from sensor outputs which are responsive to inputs from an operator of the vehicle. A regenerative braking system is connected with the brake controller and with one or more road wheels of the vehicle. The regenerative braking system is under command of the brake controller to produce a braking torque corresponding to the desired rate of deceleration. A primary speed sensing system is operatively connected with the brake controller and determines the speed and deceleration of the vehicle. A primary comparator which is operatively connected with the brake controller compares the desired rate of deceleration with the rate of deceleration determined by the primary speed sensing system. A brake monitor receives the sensor inputs from the operator of the vehicle and determines an audit range of deceleration of the vehicle. A redundant deceleration sensor which is operatively connected with the brake monitor determines the vehicle's deceleration. A secondary comparator, which is operatively connected with the brake monitor compares the audit range of deceleration with the output from the redundant deceleration sensor. Finally, a friction braking system which is operatively connected with both the brake controller and the brake monitor, provides additional braking in the event that the

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comparison results from either the primary comparator or the secondary comparator indicate that the regenerative braking system is not producing the commanded rate of deceleration.

**VI. Grounds of Rejection to be Reviewed on Appeal**

Are Claims 1, 3-8, and 10 properly rejected under 35 U.S.C. 103(a) as being unpatentable over Koga et al (U. S. 5839800)?

Is Claim 2 properly rejected under 35 U.S.C. 103(a) as being unpatentable over Koga et al (5839800) in view of Byrne et al (U. S. 4094555)?

Are Claims 9 and 11 properly rejected under 35 U.S.C. 103(a) as being unpatentable over Koga et al (U.S. 5839800) in view of Crombez et al (U.S. 6655754)?

**VII. Argument**

**The Rejection of Claims 1, 3-8 and 10 under 35 U.S.C. § 103(a) over Koga is not sustainable.**

Appellants respectfully submit that upon the record of this case, the evidence produced by the Examiner is insufficient to establish a prima facie case of obviousness with respect to the claims under appeal. As a result, the Examiner's rejection should not be sustained.

When rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of presenting a prima facie case of obviousness See In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir 1993). A prima facie case of obviousness is established by presenting evidence that would have led one of ordinary skill in the art to combine relevant teachings of the references to arrive at the claimed invention See In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988) and In re Lintner, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972). Evidence of a suggestion, teaching or motivation to modify a reference may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or in some cases, from the nature of the problem to be solved See Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc., 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1630 (Fed. Cir. 1996), Para-Ordiance Mfg., Inc. v. SGS Importers Int'l., Inc., 73 F.3d 1085, 1088, 37 USPQ2d 1237, 1240 (Fed. Cir. 1995), cert. denied, 117 S. Ct. 80 (1996). The range of sources available, however, does not diminish the requirement for actual evidence. A broad conclusory statement regarding the obviousness of modifying a reference, standing alone, is not "evidence". Thus, when an Examiner relies on general knowledge to negate patentability, that knowledge must be

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articulated and placed on the record. See In re Lee, 277 F.3d 1338, 1342-45, 61 USPQ2d 1430, 1433-35 (Fed. Cir. 2002).

In making his rejection, the Examiner (1) set forth the pertinent teachings of Koga; (2) ascertained that Koga does not teach the comparison of two values with a target deceleration to determine whether friction braking should be applied in a system; (3) stated that it is obvious to provide a dual pendulum and speed sensing device and to compare the output of such devices to a target deceleration system; and (4) concluded that one having ordinary skill in the art would have found it obvious that the time the invention was made to have designed the system of Koga to "keep tight control on the vehicle and provide a back up system in an event of a sensor failure".

Appellants respectfully submit that the Examiner has failed to establish a prima facie case of obviousness because the Examiner has not presented any evidence that would have led one of ordinary skill in the art to have modified Koga as set forth in the rejection. Moreover, the Examiner is misreading Koga because he asserts that at Column 6, Lines 57-64, Koga states "that a combination of a speed sensor and pendulum sensor can be used to find the actual deceleration". Although Koga teaches that a sensor may employ two different types of sensing means, Koga teaches only that alternative sensors are available. Koga does not teach the use of two independent sensors operatively associated with separate comparators, for determining when a regenerative braking system is not producing the commanded rate of deceleration. As a result, independent claims 1 and 10, as well as dependent claims 3-8 should be passed to issue over the Examiner's rejection.

**The Rejection of Claim 2 under 35 U.S.C. § 103(a) over Koga in view of Byrne is not sustainable.**

Appellants respectfully submit that upon the record of this case, the evidence produced by the examiner is insufficient to establish a prima facie case of obviousness with respect to the Claim 2.

With respect to claim 2, the Examiner admits that Koga does not teach comparing the output of a deceleration sensor with lower and upper deceleration targets. For this, the Examiner turns to Byrne, et al., which Examiner asserts compares the output of a single decelerometer with upper and lower deceleration target values. The Examiner asserts, too, that it would have been obvious to one of ordinary skill in the art at the time of the invention to have

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compared the deceleration sensor of Koga, et al. with an upper and lower target value in order to maintain the control of the vehicle and to increase stability.

Appellants respectfully submit that the Examiner's rejection of Claim 2 is not sustainable. In the first instance, the Examiner is discussing control of a vehicle, including vehicle stability. Appellants respectfully submit, that their claimed invention is not concerned with "vehicle stability", as that term is used in the parlance of automotive design and engineering. Rather, the Appellants' invention, as set forth above, deals with regenerative and friction braking. The Examiner's addition of Byrne to the previously cited Koga cannot overcome the deficiencies already noted with respect to Koga, and claim 2 should also be passed to issue over the Examiner's rejection.

**The Rejection of Claims 9 and 11 under 35 U.S.C. § 103(a) over Koga in view of Crombez is not sustainable.**

Regarding claims 9 and 11, the Examiner asserts that Crombez teaches use of a warning indicator for a driver. Claim 9, which depends from Claim 1, and Claim 11, which depends from Claim 10, contain all of the limitations of their respective independent claims. Thus, the addition of a warning device, extracted by the Examiner from Crombez, is insufficient to overcome the previously noted deficiencies of his base rejection of Claims 1 and 10. As a result, Claims 9 and 11, too, should be passed to issue over the Examiner's rejection.

**VIII. Claims Appendix**

A copy of each of the claims involved in this appeal, namely Claims 1-11, is attached as a Claims Appendix.

**IX. Evidence Appendix**

None.

**X. Related Proceedings**

None.

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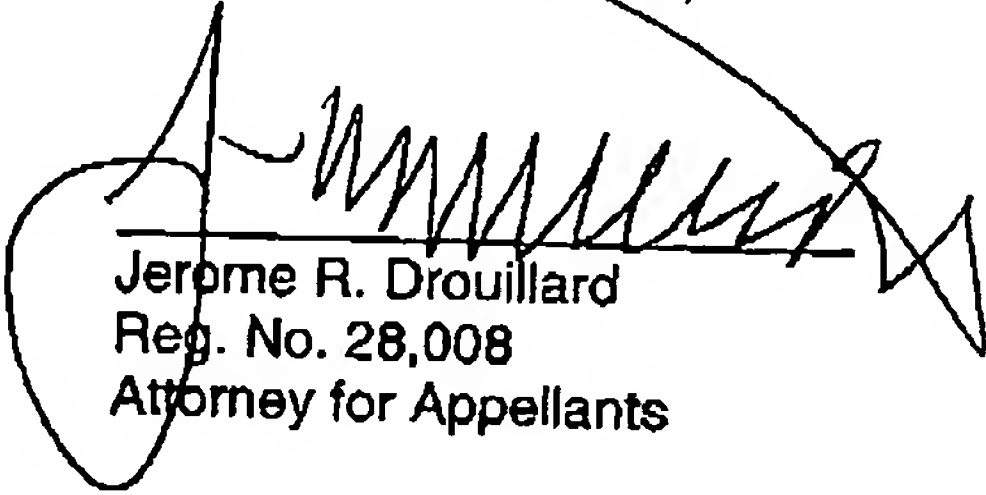
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**XI. Conclusion**

For the foregoing reasons, Appellants respectfully request that the Board direct the Examiner in charge of this examination to withdraw the rejections.

Please charge any fees required in the filing of this appeal to deposit account 06-1510.

Respectfully submitted,



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**CLAIMS APPENDIX**

Claim 1. A system for providing regenerative and friction braking in a vehicle, comprising:

a brake controller for determining a desired rate of deceleration from sensor outputs which are responsive to inputs from an operator of the vehicle;

a regenerative braking system operatively connected with said brake controller and with one or more roadwheels of said vehicle, with said regenerative braking system being commanded by said brake controller to produce a braking torque corresponding to the desired rate of deceleration;

a primary speed sensing system, operatively connected with said brake controller, for determining the speed and deceleration of said vehicle;

a primary comparator, operatively connected with said brake controller, for comparing the desired rate of deceleration with the rate of deceleration determined by said primary speed sensing system;

a brake monitor for receiving said sensor inputs from the operator of the vehicle, and for determining an audit range of deceleration of the vehicle;

a redundant deceleration sensor, operatively connected with said brake monitor, for determining the vehicle's deceleration;

a secondary comparator, operatively connected with said brake monitor, for comparing the audit range of deceleration with the output from said redundant deceleration sensor; and

a friction braking system, operatively connected with both said brake controller and with said brake monitor, for providing additional braking in the event that the comparison results from either the primary comparator or the secondary comparator indicate that said regenerative braking system is not producing the commanded rate of deceleration.

Claim 2. A system according to Claim 1, wherein said brake monitor determines an audit range deceleration of the vehicle comprising lower and upper deceleration targets, with said secondary comparator comparing the output from the redundant deceleration sensor with both of said deceleration targets.

Claim 3. A system according to Claim 1, wherein said primary speed sensing system comprises at least one wheel speed sensor.

Claim 4. A system according to Claim 1, wherein said redundant deceleration sensor comprises a g-force sensor.

Claim 5. A system according to Claim 1, wherein said primary speed sensing system comprises a g-force sensor.

Claim 6. A system according to Claim 1, wherein said redundant deceleration sensor comprises at least one wheel speed sensor.

Claim 7. A system according to Claim 1, wherein said sensor inputs which are responsive to an operator of the vehicle are outputs from a brake pedal pressure sensor, a brake pedal position sensor, and an accelerator pedal position sensor.

Claim 8. A system according to Claim 1, wherein said sensor outputs which are responsive to an operator of the vehicle are outputs from a brake pedal pressure sensor, a brake pedal position sensor, and an accelerator pedal position sensor.

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Claim 9. A system according to Claim 1, further comprising an indicator for advising an operator of the vehicle that an operational anomaly is present in the regenerative braking system.

Claim 10. A method for operating a vehicle regenerative braking system with a system monitor and redundant control capability, comprising the steps of:  
determining a desired rate of deceleration from sensor outputs which are responsive to inputs from an operator of the vehicle;  
commanding a regenerative braking system to produce braking torque corresponding to the desired rate of deceleration;  
measuring the speed and deceleration of said vehicle by means of a primary speed sensor;  
comparing the desired rate of deceleration with the measured rate of deceleration, by means of primary comparator;  
determining an audit range of acceptable deceleration of the vehicle from said sensor outputs which are responsive to inputs from an operator of the vehicle;  
measuring the vehicle's deceleration by means of a redundant deceleration sensor;  
comparing the audit range of deceleration with the output from said redundant deceleration sensor, by means of a redundant comparator; and  
providing additional braking by means of a friction braking system, in the event that the comparison results from either the primary comparator or the redundant comparator indicate that said regenerative braking system is not producing the commanded range of deceleration.

Claim 11. A method according to Claim 10, further comprising the step of activating an indicator to alert an operator of the vehicle in the event that the rate of deceleration produced by the regenerative braking system, as measured by the redundant deceleration sensor, does not lie within said audit range rate of deceleration.